Global Texture Enhancement for Fake Face Detection in the Wild

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Abstract

Generative Adversarial Networks (GANs) can generate realistic fake face images that can easily fool human beings. On the contrary, a common Convolutional Neural Network(CNN) discriminator can achieve more than99.9%accuracyin discerning fake/real images. In this paper, we conduct an empirical study on fake/real faces, and have two important observations: firstly, the texture of fake faces is substantially different from real ones; secondly, global texture statistics are more robust to image editing and transferable to fake faces from different GANs and datasets. Motivated by the above observations, we propose a new architecture coined as Gram-Net, which leverages global image texture representations for robust fake image detection. Experimental results on several datasets demonstrate that our Gram-Netoutperforms existing approaches. Especially, our Gram-Netis more robust to image editings, e.g. down-sampling, JPEGcompression, blur, and noise. More importantly, our Gram-Net generalizes significantly better in detecting fake faces from GAN models not seen in the training phase and can perform decently in detecting fake natural images